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EXAMINER

NOLAN, DANIEL A

ART UNIT

PAPER NUMBER

2654

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/456,665

Applicant(s)

KIKUMOTO, TADAO

Examiner

Daniel A. Nolan

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8-11,16,17,21-23 and 25 is/are rejected.
- 7) ☒ Claim(s) 2-7,12-15,18-20 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5,6,7 . 6) ☐ Other: _____

DETAILED ACTION

1. Because the language of certain claims is written in the manner prescribed to determine the equivalents of the element, as required by 35 U.S.C. 112, 6th paragraph, including listing the means in the specification where indicated, the Examiner is proceeding with the understanding that such claims are intended to be examined as "means plus function" claims. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967)

(Note also that this application has been included in **Art Unit 2654**, and that this AU number should be used in all future correspondence.)

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification, such as:

- "Cyclically" is misspelled (page 20 line 24, page 28 line 26).
- The term "zero-crossing" is at times hyphenated (as in page 12 line 10) and at other times it is left as two words (as in page 8 line 1).

For consistency, the term should be hyphenated wherever it is used.

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3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

"A Plural Method And System For Waveform Compression And Expansion."

Claim Objections

4. Claims 2, 8, 18 and 24 are objected to because of the following informalities:

- Claims 2 and 18 contain the indefinite adverb *approximately* two cycles.

The Examiner is proceeding with the understanding that the limitation is for two repeated cycles.

- Claim 24 contains the adjective *low*, and also contains the adjective *long*.

It is suggested to use more precise definitions.

- Claims 8 and 18 are subject to interpretation with the stipulation of *the third format*, because the claim they depend from does not mention a *second format*.

This does not provide sufficient antecedent basis for that limitation in the claims.

The Examiner is proceeding with the understanding that the format used in this claim is neither influenced by nor dependent on formats used in previous claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Suzuki^{'240}, Suzuki^{'154} & Kageyama *et al*

6. Claims 1, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki^{'240} (U.S. Patent 6,169,240 B1) in view of Suzuki^{'154} (U.S. Patent 5,566,154) and further in view of Kageyama *et al* (U.S. Patent 5,412,152 A).

7. Regarding claims 1, 21 and 22; Suzuki^{'240} reads on the feature of *generating compressed and expanded waveform* and (column 5 lines 40-42) *dividing the waveform*. Suzuki^{'240} (column 4 lines 65-68) also reads on the feature of *receiving position data including a plurality of time points* (column 17 lines 38-40) *indicating when waveform data is to be read out from the plurality of frequency band-divided waveforms, and position information elements* (column 17 lines 44-45) *indicating a particular location in the plurality of frequency band-divided waveforms corresponding to each time point* and (with 111 in figure 2) reads on the feature of *generating at least one processed waveform from each frequency band-divided waveform according to the*

(claim 39 lines 44-45) *position data and at least one compression & expansion format*
(column 69 lines 14-17).

Where Suzuki^{'240} is silent on the nature being *frequency band-divided*, but Suzuki^{'154} (column 9 lines 18-33 & column 13 line 53) reads on the feature of *frequency band-dividing the original waveform data to produce a plurality of frequency band-divided waveforms* which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method and/or teachings of Suzuki^{'154} to the device/method of Suzuki^{'240} so as to maintain the correlation of bandwidth with frequency divisions during coding.

Furthermore, Suzuki^{'240} is silent on the detailed specific features of *creating waveform by combination*. Kageyama et al (column 7 lines 21-47) reads on the feature of *superimposing a plurality of processed waveforms generated from all frequency band-divided waveforms to form the compressed and expanded waveform* which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Kageyama et al to the device/method of Suzuki so as to provide an advantage in waveform controllability.

Suzuki^{'240}, Suzuki^{'154}, Kageyama et al, Chiba & Suzuki^{'480}

8. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki^{'240} in view of Suzuki^{'154} and further in view of Kageyama et al as applied to claim 1 above, and further in view of Chiba (U.S. Patent 5,675,709) and further in view of Suzuki^{'480} (U.S. Patent 4,679,480).

9. Regarding claim 8 as understood by the Examiner, Suzuki^{'240} reads on the feature of *generating at least one processed waveform from each frequency band-divided waveform* (column 5 lines 40-42) but is silent on the issue of *zero-crossing parameters*. Chiba (111 in figure 13) reads on the feature of *mark addresses that designate a starting point at zero-crossings of waveform segments* (column 15 lines 4-18) which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Chiba to the device/method of Suzuki as a reliable indication of a transition in a sound signal.

Suzuki^{'240} is also silent on the subject of *pitch determining read-out speed*. Suzuki^{'480} (claim 9 lines 20-22) read on the feature of *receiving pitch data indicating a read-out speed of the waveform portions* which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Suzuki^{'480} to the device/method of Suzuki^{'240} so as to prevent the pitch from being changed by processing.

Suzuki^{'240} reads on the feature of *reading out portions of at least one waveform segment at the read-out speed at every time point* (column 17 lines 38-40) *of the frequency band-divided waveform, the portions of at least one waveform segment comprising waveform data starting at the mark address* (column 17 line 62) *associated with the waveform segment corresponding to the time point* (column 6 lines 29-40), *sequencing consecutive portions of at least one waveform segment to generate a processed waveform from the frequency band-divided waveform*.

10. Regarding claim 9, the claim is set forth with the same limits as claim 8.

Suzuki^{'240} (column 34 lines 23-29) reads on the feature of *repetitively reading out portions of at least one waveform segment when a 1st interval between addresses designated by the plurality of position information elements is less than a 2nd interval between addresses in the plurality of mark addresses.*

11. Regarding claim 10, the claim is set forth with the same limits as claim 8.

Suzuki^{'240} (2nd-6th lines, claim 42) reads on the feature of *jump reading out portions of at least one waveform segment when a 1st interval between addresses designated by the plurality of position information elements is greater than a 2nd interval between addresses in the plurality of mark addresses.*

Suzuki^{'240}, Suzuki^{'154} & Kageyama et al

12. Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki^{'240} in view of Suzuki^{'154} and further in view of Kageyama et al.

13. Regarding claim 11, the claim is set forth with the same limits as claim 1.

Suzuki^{'240} (column 67 line 16) reads on the feature of *compressing or expanding each processed waveform by an identical amount of time.*

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14. Regarding claim 16, the claim is set forth with the same limits as claim 1.

Suzuki^{'240} teaches dividing waveforms but not explicitly in terms of *frequency-band*.

Suzuki^{'154} (column 9 lines 18-30) read on the feature of *dividing the original waveform data into a plurality of frequency band-divided waveforms, each frequency band-divided waveform having a plurality of frequency band waveform components*. It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Suzuki^{'154} to the device/method of Suzuki^{'240} so as to efficiently process all critical bands.

Suzuki^{'240}, Suzuki^{'154}, Kageyama et al & Suzuki^{'478}

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki^{'240} in view of Suzuki^{'154} and further in view of Kageyama et al and further in view of Suzuki^{'478} (U.S. Patent 5,347,478).

16. Regarding claim 17, the claim is set forth with the same limits as claim 16.

Suzuki^{'240} does not mention *time windows* and, while Suzuki^{'154} does (column 12 lines 55-59), neither reference employs them in *multiplying waveforms*. Suzuki^{'478} (column 24 lines 1-3) reads on the feature of *multiplying each processed waveform with a level-controllable time window*;

Suzuki^{'240} does not mention filtering for frequency, while Suzuki^{'154} does (column 15 lines 58-59) reads on the feature of *filtering at least one of the plurality of processed waveforms generated from the plurality of frequency band-divided waveforms according*

to a frequency band of the frequency band-divided waveform associated with each processed waveform... which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Suzuki^{'154} to the device/method of Suzuki^{'240} so as to calculate energies in every band.

Suzuki^{'478} (column 23 lines 39-40 and column 45 lines 39-46) reads on the feature of *summing the processed waveforms to form the compressed and expanded waveforms*. It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Suzuki^{'478} to the device/method of Suzuki^{'240} so as to perform data reduction after compression processing.

Suzuki^{'240} & Kageyama et al

17. Claims 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki^{'240} in view of Kageyama et al.

18. Regarding claim 23, Suzuki^{'240} reads on the feature for a *compression & expansion means with which the plurality of frequency band-divided waveforms are apportioned to at least two kinds of compression & expansion formats (with the combination of all or some of several in column 52 lines 5-10) and each of the plurality of frequency band-divided waveforms are compressed and expanded in a direction of a temporal axis by an identical amount (column 67 line 16)*.

While Suzuki^{'240} reads on processing *in the direction of the temporal axis* (column 1 lines 11-12), the reference is silent on the detailed specifics of *creating waveform by combination*. Kageyama et al (column 7 lines 21-47) reads on the feature of a *superimposing means in which, by superimposing the plurality of compressed and expanded frequency band-divided waveforms, an original waveform that has been compressed or expanded in the direction of the temporal axis is formed*. It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Kageyama et al to the device/method of Suzuki so as to allow waveform control.

Allowable Subject Matter

19. Claims 2-7, 12-15, 18-20 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter:

- The present invention is directed to compressing and expanding waveforms using two different format techniques to minimize quality degradation.
- Claims 2 and 18 (both as understood by the Examiner) identify the uniquely distinct feature "*...reading out 1st waveform from the frequency band-divided*

waveform of [approximately] two repeated cycles associated with the cycle corresponding to every other time point and waveshaping; and reading out 2nd waveform data from the frequency band-divided waveform of [approximately] two repeated cycles starting at the opening and starting address associated with the cycle corresponding to every other time point that does not coincide with the reading out of the 1st waveform data, and waveshaping the 2nd waveform data with the envelope to form a 2nd processed waveform."

- Claims 5 and 18 (claim 18 as understood by the Examiner) identifies the uniquely distinct feature, "*reading out successive 1st waveform portions from the frequency band-divided waveform at the read-out speed at every other time point; and reading out successive 2nd waveform portions from the frequency band-divided waveform at the read-out speed at every other time point that does not coincide with the reading out of successive 1st waveform portions, waveshaping the 1st and 2nd read-out waveform data with the envelope to form processed waveforms.*"
- Claim 12 identifies the uniquely distinct feature, "... sampling the original waveform data at a sampling frequency F_s ; and dividing the original waveform data into N frequency band-divided waveforms, wherein the Mth frequency band-divided waveform, where M is an integer varying from one to N, is sampled at a sampling frequency equal to F_s divided by $2^{(M-1)}$, and has a frequency band ranging from F_s divided by $2^{(M+1)}$ to F_s divided by $2^{(M)}$.

- With respect to all the above indicated features, the closest prior art of Suzuki discloses the initial waveshaping process but fails to anticipate or render the above underlined limitations obvious.
- Claim 24 identifies the uniquely distinct feature of "...a processing period that is as long as the frequency band-divided waveform which possesses the waveform component of a low frequency band. Suzuki discloses the use of low frequency filters without stipulating either processing on the basis of the characteristic or specifically limiting processing by these means, so the features are neither anticipated nor were they found in obvious combination in the prior art of reference.
- Claims 3-4, 6-7, 13-15 and 19-20 depend from claims that have been found to be allowable and so are they allowable as a consequence.

21. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kitamura (U.S. Patent 3,975,763 A) signal time compression or expansion system.
- Blackledge (U.S. Patent 4,025,723 A) real time amplitude control of electrical waves.
- Ishigaki (U.S. Patent 4,430,754 A) noise reducing apparatus.
- Suzuki^{'383} (U.S. Patent 5,642,383 A) audio data coding with plural compressions.
- Kikumoto et al (Japan Patent 2000-075899 A and U.S. Patent 6,323,797 B1) synthesis apparatus for waveform signal and time base compression and expansion.
- Kitayama (Japan Patent 2001-255876 A) method for expanding and compressing musical sound waveform signal in time base direction.
- Suzuki^{'937} (U.S. Patent 4,876,937) reads out waveforms retaining stored pitch.
- Suzuki^{'183} (Japan Patent 1986--15183) weights reconstitute stored waveforms.

23. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Daniel A. Nolan at telephone (703) 305-1368 whose normal business hours are Mon, Tue, Thu & Fri, from 7 AM to 5 PM.

If attempts to contact the examiner by telephone are unsuccessful, supervisor Richemond Dorvil can be reached at (703)305-9645.

The fax phone number for Technology Center 2600 is (703)872-9314. Label informal and draft communications as "DRAFT" or "PROPOSED", & designate formal communications as "EXPEDITED PROCEDURE". Formal response to this action may be faxed according to the above instructions,

or mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or hand-delivered to:

Crystal Park 2,
2121 Crystal Drive, Arlington, VA,
Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 Customer Service Office at telephone number (703) 306-0377.

DAN/d
July 25, 2003

Daniel A. Nolan
Examiner
Art Unit 2654


Richemond Dorvil
Primary Examiner